

CLAIMS

1. A method of inducing gene expression in a plant which comprises providing the plant with characters
5 of a repressor and operator both constituting a gene expression inducing system with an actinomycete autogenous regulatory factor as an inducer by gene transfer and administering the actinomycete autogenous regulatory factor to the transformed plant to thereby induce the
10 expression of a gene placed under the control of the operator at a site of administration of the actinomycete autogenous regulatory factor.

2. The method according to Claim 1,
15 wherein said actinomycete belongs to a genus Streptomyces.

3. The method according to Claim 1,
20 wherein said actinomycete is Streptomyces virginiae.

4. The method according to any of Claims 1 to 3,
wherein said autogenous regulatory factor is a butyrolactone autogenous regulatory factor.

5. The method according to any of Claims 1 to 3,
25 wherein said autogenous regulatory factor is virginiae butanolide.

6. The method according to any of Claims 1 to 5,
30 wherein said gene expression inducing system is involved in a production of an antibiotic.

7. The method according to any of Claims 1 to 5,
35 wherein said gene expression inducing system is involved in a production of virginiamycin.

8. The method according to any of Claims 1 to 7,
wherein said repressor gene is a barA gene.

5 9. The method according to any of Claims 1 to 8,
wherein said repressor gene contains a region
comprising a nucleotide sequence shown under SEQ ID NO:1.

10 10. The method according to any of Claims 1 to 9,
wherein said repressor gene contains a region coding
for an amino acid sequence shown under SEQ ID NO:2.

15 11. The method according to any of Claims 1 to 10,
wherein a promoter for said repressor gene is a plant
promoter.

20 12. The method according to Claim 11,
wherein said plant promoter is a Cauliflower mosaic
virus 35S promoter.

13. The method according to any of Claims 1 to 12,
wherein a nucleotide sequence of said operator is
derived from a barA, barB or barX gene.

25 14. The method according to any of Claims 1 to 12,
wherein a nucleotide sequence of said operator is
BARE-1, BARE-2 or BARE-3.

30 15. The method according to any of Claims 1 to 12,
wherein a nucleotide sequence of said operator is
BARE-3.

35 16. The method according to any of Claims 1 to 15,
wherein the nucleotide sequence of said operator
contains a region comprising a nucleotide sequence shown

under SEQ ID NO:3.

17. The method according to any of Claims 1 to 16,
wherein a promoter for said gene placed under the
5 control of the operator is a plant promoter.

18. The method according to Claim 17,
wherein said plant promoter is a Cauliflower mosaic
virus 35S promoter.

10 19. The method according to Claim 17 or 18,
wherein said operator is disposed in at least one
place in said plant promoter.

15 20. The method according to Claim 17 or 18,
wherein said operator is disposed in at least one
place in the vicinity of a site 3' downstream or in the
vicinity of a site 5' upstream of a TATA box of said plant
promoter.

20 21. The method according to any of Claims 17 to 20,
wherein said operator is disposed, together with the
TATA box of said plant promoter, in a manner shown under
any of SEQ ID NO:4 through SEQ ID NO:7.

25 22. The method according to any of Claims 1 to 21,
wherein said gene placed under the control of the
operator is a gene capable of providing the plant with
fertility.

30 23. A plant transformed by the method according to
any of Claims 1 to 22.

24. Tobacco (Nicotiana tabacum L.) transformed by
35 the method according to any of Claims 1 to 22.

25. A cultured plant cell transformed by the method according to any of Claims 1 to 22.

5 26. A cultured tobacco cell transformed by the method according to any of Claims 1 to 22.

27. A cultured tobacco BY2 cell transformed by the method according to any of Claims 1 to 22.

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28. A repressor gene
which constitutes a gene expression inducing system with an actinomycete autogenous regulatory factor as an inducer,

15 a promoter of said repressor gene being a plant promoter.

29. The repressor gene according to Claim 28,
wherein said plant promoter is a Cauliflower mosaic virus 35S promoter.

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30. The repressor gene according to Claim 28 or 29 wherein said repressor gene is a barA gene.

25 31. The repressor gene according to any of Claims 28 to 30

wherein said repressor gene contains a region comprising a nucleotide sequence shown under SEQ ID NO:1.

30 32. The repressor gene according to any of Claims 28 to 31

wherein said repressor gene contains a region coding for an amino acid sequence shown under SEQ ID NO:2.

35 33. A modified promoter

in which an operator constituting a gene expression inducing system with an actinomycete autogenous regulatory factor as an inducer is disposed in at least one place in the vicinity of a site 3' downstream or in the vicinity of
5 a site 5' upstream of a TATA box of a plant promoter.

34. The modified promoter according to Claim 33,
wherein said plant promoter is a Cauliflower mosaic
virus 35S promoter.

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35. The modified promoter according to Claim 33 or
34,
wherein a nucleotide sequence of said operator is
BARE-1, BARE-2 or BARE-3.

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36. The modified promoter according to any of Claims
33 to 35,
wherein the nucleotide sequence of said operator
contains a region comprising a nucleotide sequence shown
20 under SEQ ID NO:3.

37. The modified promoter according to any of Claims
33 to 36,

wherein said operator is disposed, together with the
25 TATA box of said plant promoter, in a manner shown under
any of SEQ ID NO:4 through SEQ ID NO:7.